Henry S. Kernan

Record of Cinchona
Trees

No. 6 (50 HOJAS)

GOMEZ & PAEZ
IMPRENTA
Y PAPELERIA
BUCARAMANGA

CALLE 35 CARRERA 14
TELEFONO 4-0-5-2

Siempre que Ud. necesite algún artículo de Papelería, o un trabajo de Imprenta y Rayado en condiciones satisfactorias, ocúpenos que lo atenderemos gustosamente.

Calidades, altas; precios, los más bajos.

① November 30, 1943.
Altitude: 1750
Height; 4 ft.
Diameter: ½ inch.
Species: C. pubescens
Exposure: Ridgetop
Crown class: Suppressed.

Apparently a seedling sprouting on top of a small tuno sprout 2 inches at stump. This is the first specimen we saw going up. Stem is very hirsute.

Werman

Date: November 30, 1943. Species: C. pubescens
Locality: Hacienda "Los Andes", Rionegro, Santander
Altitude: 1750
Height: 4 ft
D.B.H: ½ inch
Exposure: Ridgetop
Degree of Slope: ——
Crown Class: Suppressed
Grafte Test:
Remarks: Apparently a seedling sprouting on top of a small tuno sprout 2 inches at the stump, this is the first specimen of Cinchona we saw going up. The stem is very hirsute.

November 30, 1943. Species: Palicourea sp.
Hacienda "Las Andes"
1760 meters
20 ft.
2 inches
Ridgetop
Intermediate

The quineros refer to this as "quina," which it obviously is not.

② Nov. 30, 1943.
Altitude: 1760
Height: 20 ft.
D.B.H.: 2 inch.
Species: The quineros refer to it as "quina," which it obviously is not.
Exposure: Ridgetop
Crown class: intermediate

Kernan

November 30, 1943. Species; Palicourea
Hacienda "Las Andes"
1780 meters
A shrub by the trail.

This is what the quineros refer to as "punta-de-lanza".

③ November 30, 1943.
Altitude: 1780
Height & D.B.H.: A shrub by the trail.
Species: This is what the quineros refer to as "punta-de-lanza".

Kernan

November 30, 1943. Species:
Hacienda "Las Andes"
1960 meters.
20 ft.
1 inch
SW
Suppressed

Bonitto called this quina and took out samples; but in my opinion it is not.

④ November 30, 1943.
Altitude: 1960
Height: 20 ft.
D.B.H.: 2 inch
Exposure: SW
Crown class: Suppressed
Species: Bonitto called this quina and took out samples; but in my opinion it is not.

November 30, 1943. Species:
Hacienda "Las Andes"
2100 meters
4 ft.
½ inch
Ridgetop

This is from a shrub-like tree in full sunlight by the trail, in a pasture. There are no poles big enough for a bark sample.

⑤ November 30, 1943.
Altitude: 2100 M.
Exposure: Ridgetop
Height & D.B.H.: Seedling
4 ft.

This looks like C. pubescens (sample 1) But I am not sure. It is quite rare here and we cannot find a pole big enough for a bark sample.

November 30, 1943. Species:
"Cruces de Heredia"
Hacienda "Los Andes"
2140 meters
25 ft.
4 inches
Ridgetop
Suppressed

This is what the quineros insist is quina, but I am not sure. Just to satisfy them I am going to take bark samples at various altitudes. Bark sample.

⑥ November 30, 1943.
Altitude: 2140 Meters
Height: 25 ft.
D.B.H.: 4 inches
Exposure: Ridgetop
Crown class: Suppressed
Species: C. pubescens (?)

This looks like ② but I am beginning to think perhaps it is C. pubescens.

Bark sample

"Cruces de Heredia"
Hacienda "Los Andes"
Rionegro, Santander

Kernan

December 1, 1943. Species:
1800 meters "Cuchilla de Roblal"
60 ft. Haciend "Los Andes"
6 inch
S W
Co-dominant

This again is what the mayordomo calls "quina amarilla" and says is being harvested hereabouts. Bark sample
Seed pods

⑦ December 1, 1943.
Altitude: 1800
Height: 60 ft.
D.B.H.: 6 inch.
Exposure: S W
Crown Class: Co-dominant
Species: C. pubescens (?)

This is what the mayor-domo calls "quina amarilla" and says that it is being harvested hereabouts.

Bark Sample

"Cuchilla de Roblal"
Hacienda "Los Andes"
Rionegro, Santander

Kernan

December 1, 1943.   Species:
"Cuchilla de Roblal"
Hacienda "Los Andes"   1900 meters
45 ft.
4 inches
S.W.
Intermediate
Same as ⑦ __Bark__ __sample__

⑧ December 1, 1943.
Altitude: 1900
Height: 45 ft,
D.B.H.: 4 inches
Crown Class: Intermediate
Exposure: SW
Species: C. pubescens (?)

Bark sample

Same as ⑦

"Cuchilla de Roblal"
Hacienda "Los Andes"
Rionegro, Santander

December 1, 1943.   Species:
"Cuchilla de Roblal"
Hacienda "Los Andes"
2020
30 ft.
4 inches
N W
Intermediate
Same as ⑦ __Bark__ __sample__

⑨ December 1, 1943,
Altitude: 2020'
Height: 30 ft,
D.B.H.: 4 inches,
Crown Class: Intermediate
Exposure: N W.
Species: C. pubescens (?)

Same as ⑦

Bark sample

"Cuchilla de Roblal"
Hacienda "Los Andes"
Rionegro, Santander

December 1, 1943.   Species: C. pubescens
"La Esperanza"
Hacienda "Las Andes"
1500 M.
50 ft.
7 inch.
W
Co-dominant

This is growing in a stand of scrubby second-growth quina in the full sunlight of an old pasture. I am sure that this is C. pubescens; but I am very doubtful of the other samples.

Bark Sample   Seed pods

(10) December 1, 1943
Altitude: 1500 M.
Height: 50 ft.
D.B.H.: 7 inch.
Exposure: W
Crown class: Co-dominant
Species: C. pubescens

This is growing in a stand of scrubby, second-growth quina in full sunlight. I am sure this is C. pubescens; but I am very doubtful of the other samples.

Bark Sample

"La Esperanza"
Hacienda "Los Andes"
Rionegro, Santander

December 4, 1943. Species: C. officinalis
San Antonio, near Mogotes, Santander.

This is from a bunch of suckers growing from the stump of a tree cut three years ago in clearing right-of-way. They are about seven feet high in full sunlight.

(11) December 4, 1943.
Altitude: 2020
Height of D.B.H.: 7 ft.
Suckers from stump cut 3 years ago in clearing road. In full sunlight.
Locality: San Antonio near Mogotes, Santander.
Species: C. officinalis

December 4, 1943. Species: C. pubescens
near San Antonio, Mogotes, Santander.
2160
90 ft
28 inches
W
Dominant
Grahe test: positive
Analysis 1.7 TAC

A very large specimen found next to the road from Mogotes to San Joaquin

12 December 4, 1943.
Altitude: 2160
Height: 90 ft.
D.B.H.: 28 inches.
Crown class: Dominant
Exposure: W.
Species: C. pubescens
Locality: San Antonio,
near Mogotes, Santander.
Analysis: 1.7 TAC

December 4, 1943. Species: C. officinalis
Olla de Belleza, Mogotes, Santander.
2100 M.
60 ft.
9
SW
Co-dominant

Specimens show leaves and next spring's flowers beginning. They were taken from a tree already cut and peeled.

13 December 4, 1943.
Altitude: 2100 meters
Locality: Olla de Belleza, Mogotes, Sant.
Height: 60
D.B.H.: 9
Crown Class: Sub-dom.
Exposure: SW slope
Species: C. officinalis
next spring's flowers starting

Kerman (14) Kerman & Herma

Dec. 19, 1943. Sample No. 10919
^1675

Locality: Chimborazo, near La Providencia. Between Abrego and Cáchira, Sant. del Norte

Altitude: 2640 Meters.
D.B.H.: 16 inches
Hgt.: 50 ft.
Exposure: SW
Crown Class: Dominant
Species: C. pubescens,
(quina rosa)

Dense second-growth forest, 20 ft. high. This tree stands out above the canopy. Leaves and twigs almost smooth. Evidently survived the burn.

TAC = 2.5%

1674 Kerman

December 21, 1943. No. 15

Locality: Chimborazo near La Providencia. Between Abrego and Cachirá, Sant. del Norte. Drainage of Q. San Isidro, Rio San Pablo.
Altitude: 2420 Meters
D.B.H.: 4 inches
Hgt: 25 ft.
Exposure: SW
Crown Class: Intermediate
Species: C. officinalis
(tunja)

Dense undergrowth under open canopy of oak. Signs of fire. 5-7 veins. No red coloring in evidence. Flowers and fruits not available.

~~TCA = 3.8%~~

TCA = 3.9
QS = 2.3

1672

Kernan No. 16

Date: December 23, 1943.

Locality: Hacienda "La Esperanza" Quebrada de La Esperanza. Base of Altura de Jurisdicciones. 10 Kilometers NW of Cachirá, Santander del Norte.

Altitude: 2230 Meters

D.B.H.: 6 inches

Hgt: 30 ft.

Crown class: Dominant

Species: C. officinalis (quina tunja)

Exposure: SW in full sunlight.

Bark from trunk

Priority 2

TCA = ~~5.0%~~ 4.8 Sulphate 2.4

Kernan No. 17

Date: 23 of December, 1943.

Locality: Quebrada de La Esperanza, Base of Altura de Jurisdicciones 10 Kilometers NW of Cachirá, Sant. del Norte.

Altitude; 2300 Meters.

D.B.H.: 2 inches

Hgt; 18 ft.

Crown class; Intermediate

Exposure: SW ridgetop

Species; Ladenburgia ~~sp.~~ undata

Remarks: Same as ~~that~~ collected at "Las Andes"

Flowers, fruits, stipules

Kernan No. 18. 1673

Date: 23rd of December, 1942.
Hacienda La Esperanza
Locality: Quebrada de la Esperanza Base of Altura de Jurisdicciones. 10 Kilometers NW of Cachira, Sant. del Norte.

Altitude: 2160 Meters

D.B.H. & Hght: A clump of stump sprouts in one of a pasture. The tree was cut 10 years ago. Growing in full sunlight.
Photograph
Seeds, pods
Incipient flowers
Bark sample.

Priority 3 TCA = 0.7

Species: C. pubescens
(quina roja)

Kernan No 19

Date: June. 21, 1943.

Locality: La Providencia Rio San Pablo.

Species: Ladenbergia sp.

Herman 20
Herman 10925 1677
Date: Dec. 24, 1943.
Hacienda Tia Maria
Locality: Altura de Las Palmitas. 8 Kilometers N.W. of Cachirá Santander del Norte. Quebrada de [illegible]
Altitude: 2470 M.
D.B.H.: 6 inches [illegible]
Height: 22 ft.
Growing on a NE steep slope partially cleared by fire. Scattered trees and thick underbrush.
TAC = 2.8
Species: C. officinalis (quina tinga)
Priority 2   Bark from trunk.

Herman No. $\frac{1762}{21}$
Dec. 27, 1943.
Locality: Quebrada de la Cabeza. A pie del Cerro de Piedra negra, 3 Kilometers NE of Cachira, Santander del Norte.
Altitude: 2700 Meters
D.B.H.: 20 inches
Height: 40 ft.
Exposure: Steep SW slope
Crown Class: Co-dominant
Species: C. pubescens.

Bark has recently been removed from the standing tree up to 20 ft.

Bark sample 20-25 ft.
Photograph

Priority 3
TCA = ~~[illegible]~~ 2.5%

Seed pods, incipient flowers, stipules

Kernan No. 22 1267
Dec. 27, 1943.
Locality: Angelina, Head-waters of Rio Cachira. 2 Kil. NE of Cachira, Sant. del Norte.
Alt: 2500 M.
D.B.H.: 5 inches
Height: 20 ft.
Exposure: Steep SW slope
Crown class: Dominant in open, brushy, pasture.

Species: guettarda hirsuta. Has hairy, pointed, stipules but long, short calyx lobes. The local name is "quino," the guide says it is rare. Bark from trunk.

Priority 3
Identified by Dr. Little as

guettardia sp.

1720
Kernan No. 23 ✓
Date: Dec. 28, 1943.
Locality: Hacienda Peralonso, Quebrada de Peralonso. Entre Cachira y Villa Caro. Sant. del North,
Altitude: 2120 M.
D.B.H.: 6 inches
Height: 25 ft.
Crown Class: Intermediate
Species: C. officinalis (tunja)
Exposure: Steep E slope

Growing in under story of thick forest.

Bark from trunk

Priority 2

~~TCA 4.6~~%

TCA = 4.3
QS = 3.3

Kernan No. 24 X
Date: Dec. 28, 1943.
Locality: Hacienda "El Jound"
On top of steep ridge between Quebrada de Peña to W and Quebrada Corsona to E. Between Cachirá and Villa Caro, Sant. del Norte.
Altitude: 2580 M.
D.B.H.: 7 inches
Height: 30 ft.
Crown class: Dominant ?
Species: Ladenbergia macrocarpa
Growing in thick under brush of old pasture.

Leaves, stipules, seeds

Kernan No. 25 1721 ✓
Date: Dec. 29, 1943.
Locality: Hacienda "El Carmel", Quebrada de Peña Negra, Between ~~ee~~ Cachirá and Villa Caro, Sant. del Norte.
Altitude: 2420 M.
D.B.H.: 16 inches
Height: 60 ft.
Exposure: S 70 W steep slope at bottom of [illegible]
Crown class: Co-dominant
Species: C. pubescens (roja)

Bark from trunk

Priority 3

TAC = 2.6%

1722

Kernan No. 26 ✓
Dec. 28, 1943
Locality: Quebrada de Sardinata. Hacienda Sardinata.
Between Cachirá and Villa
Caro, Sant. del Norte.
Altitude: 2500 feet.
D.B.H.: 8 inches
Height: 40 ft.
Crown Class: Intermediate.
Exposure: Steep E slope in
thick forest.
Species: C. pubescens
(Quina roja)

Bark from trunk

Priority 3

TAC = 2.1

Leaves [redacted] striate 20
Stipules strongly keeled
Veins 5-7 1711 ✓
Kernan No. 27
Date Dec. 30, 1943.
Locality: Cherro Piojó. Hacienda "Las Vegas". Headwaters of Quebrada Charrera NW of Cachirá. Sant. del Norte.
Altitude: 2780 M.
D.B.H.: 3 inches
Height: 30 feet
Crown Class: Suppressed
Exposure: S side of deep
ravine growing on rocky
ledge 20 feet above bottom
of ravine. Deep wet forest.
Species: C. officinalis (Quina...)
Bark from trunk + branches
Priority 2. TCA = 5.7% QS = 4.7

Seeds, stipules
Photo

27

1709

Kernan No. 28 ✓
Date: Dec. 31, 1943.
Locality: Las Esmeraldas, Quebrada Esperanza, Cerro Jurisdicciones NW of Cachirá, Sant. del Norte, Altitude: 2140 M.
D.B.H.: 3 inches
Height. 20 ft.
Crown Class: Intermediate
Exposure: SW steep slope.
Species: C. officinalis (quina tunja)

Growing in the understory of a dense, thick forest as part of a mixture of small C. spp. and saplings. All the larger trees have been taken out. Bark from length of bole. Priority 2

TCA = 3.9
[illegible] 3.1

29

1710

Kernan No. 29 ✓
Date: Dec. 31, 1943.
Locality: Las Esmeraldas, Quebrada La Esperanza, Cerro Jurisdicciones NW of Cachirá, Sant. del Norte
Altitude: 2090 M.
D.B.H. 10 inches
Height. 30 ft.
Crown Class: Intermediate
Exposure: Steep SW slope.
Species: C. pubescens (quina roja)
Bark from trunk.

Priority 3

TAC = 1.4

31

Kernan No. 30 X
Date: Dec. 31, 1943.
Locality: Casa Las Vegas, Quebrada Las Vegas, Headwaters of Quebrada Cabrera, NW of Cáchira, Sant. del Norte.
Altitude: 2100 M.
DBH: 3 inches.
Height: 25 ft.
Growing in full sunlight in open pasture.
Species: Guettarda hirsuta (quina amarilla)
Samples, wood, flowers, fruit.
Photo.
Identified by Dr. Little as Guettarda sp.

37

Kernan No. 31 17th
Date: Jan 1, 1944.
Locality: Quebrada Quicial 3 kilometers, SW of Villa Caro, Sant. del Norte.
A sapling growing in understory of thick, scrubby forest 20 ft. high. Bark has already been taken off once, so that the sample represents a re-growth of bark.
Alt. 1450 M.
Priority 3   TCA = ~~3.7~~% 3.4
Species: C. officinalis   Sulphate 3.0
(quina tuna)

41

1713
Kerman No. 32 ✓
Date: Jan. 1, 1944.
Locality; Quebrada Guácal, 24 Kil. west S.W. Villa Caro, Headwaters Rio Sardinata Sant. del Norte.
Alt.: 2240 M.
Sapling – Tree, second-growth forest 20 ft. high, full sunlight
Exposure NE
Species: Guettarda [illegible]
(quina amarilla)

Priority 2

Identified by Dr. Little as Guettarda sp.

R3

1714 ✓
Kerman No. 33
Date: Jan 1, 1944.
Locality Quebrada Guácal Headwaters of Rio Sardinata. 24 Kil. S.W. of Villa Caro, Sant. del Norte. Altitude: 2200 M.
D.B.H.: 5 inches
Height: 20 feet.
Growing in full sunlight in scrubby, second-growth 20-ft. forest. NE exposure
Species: C. pubescens
(quina roja)
TAC = 0.6%
Priority 3
Bark from trunk

45

Kernan No 34
Date: Jan 1, 1944.
Locality: Quebrada Guisol. SW of Villa Caro, Sant. del Norte.
Altitude: 2000 M. (G.)

Leaf samples of small seedlings, 1-4 ft. high growing by the trail. They may belong to the same species as the "quina" of Cachirá or "quina amarilla" of Las Vegas.

61

Kernan No. $\overset{1800}{35}$ ✓
Date: January 5, 1944.
Locality: Hacienda San Luis, Quebrada Piecito, NW of Gramalote, Sant. del norte. Base of [illegible] [illegible] [illegible], Rogue [illegible] [illegible] [illegible]
Altitude: 1960 M.
D.B.H.: 7 inches
Height: 18 feet
Exposure: E slope in open, burned pasture, Tree form indicates that it has grown exclusively in full sunlight.
Species: C. officinalis
(quina tuna)
Bark from trunk TCA = 5.0
Priority 2 ~~TCA~~ % QS = 3.5

67

Kernan No. 36
Date: Jan. 6, 1944.
Locality: El Alto de Galapago.
Quebrada de Pangila. Between
Gramalote and Villa Caro,
Sant. del Norte. Alt: 1960
D.B.H.: 12 inches
Height: 50 feet
Exposure: Steep S slope.
Crown class: Co-dominant
Species: Ladenbergia sp. (?)
(tuno)
guacharaco (Sr. Daniel Mora)
wood very good. Grows in
good soil. Walnut indicates
good soil and also Tuno.

Unidentified by Dr. Ewing

73

1803
Kernan No. 37 ✓
Date: Jan. 7, 1944.
Locality: Narigon, Hacienda
"El Cedral." Altura de Espartillo
Quebrada Caldera, NW of
Gramalote, Sant. del Norte.
Altitude: 2330 M.
D.B.H.: 3 inches
Height: 20 ft.
Exposure: Steep E slope
Crown class: Intermediate in
low, thick forest.
Species: C. officinalis (tuna)
Bark from trunk
Priority 2
~~TCA = 4.5%~~ TCA = 5.3
QS = 5.5

77

1781

Kernan No. 38 ✓

Date: January 7, 1944.

Locality: Hacienda "El Cedral"

Aldea de [illegible] [illegible]

[illegible], N.W. of Quezaltenango,

[illegible] de [illegible].

Altitude: 23[illegible] M.

Age: 17 years.

Height: 50 feet

Exposure: Steep NE slope

[illegible] [illegible], [illegible] above

the waterline.

Species: C. pubescens (quina roja)

[illegible] from trail

Priority 3

TCA = 2.3

79

Kernan No. 39

Date: 7 Jan. 1944.

Locality: Hacienda "El Cedral"

Quebrada Collana, N.W. of

Quezaltenango, Dept. de [illegible].

Altitude: 1966 M.

A stump sprout

12 years old & 15 feet high

growing in steep pasture

in full sunlight in

what was formerly of

[illegible] stand of quinine.

Species: C. officinalis

(Hawa)

Stripping, loose, flowering

fruit.

87

[illegible] 1796
Kernan No. 40 A – B
Date: January 11, 1944.
Locality: Quebrada de Ventanitas. Headwaters of Q. Aguas Blancas. NW of Villa Caro, Santander del Norte.
Altitude: 2020 M.
D.B.H.: 14 inches
Height: 40 feet.
Exposure: Very steep N slope near bottom of draw.
Crown Class: Intermediate in thick forest of dominant oaks.
Species: C. officinalis (tuna)
Sulph. 3.2
A — bark from trunk TCA = 4.9
B — " " upper br. TRA 3.7%
QS: 2.6
Priority 2

91

1801 1798
Kernan No. 41 A – B
Date: Jan. 11, 1944
Locality: Altura de Las Pavas. Headwaters of Q. de Aguas Blancas. NW of Villa Caro. Sant. del Norte.
Alt: 2210 M.
D.B.H.: 18 inches
Height: 70 feet
Exposure: N slope
Crown Class: Dominant in tall, open forest.
Species: C. pubescens (quina roja)
A — trunk TCA: 2.8
B — branches TCA = 2.4
Priority 3

93

1797

Kenison 42

Date; January 11, 1944.

Locality: "Las Paredes" Headwaters of R. Agua Blanca, N W of Villa Cora, Sant. del Norte. Alt.: 2100 M.

Leaves and stipules from a small sapling in the understory of this forest of dominant oak. All the large trees have been taken out. I was not able to reach the upper slopes where the large trees are.

Bark sample from cascarilleros already taken out from same locality and dried. TCA= 6.7% QS = 3.8

97

Kenison No. 43

Date: Jan. 12, 1944.

Locality: Headwaters of R. Aguas Blancas. N W of Villa Cora. Sant. del Norte.

Alt.: 1530 M.

This is what I called [illegible] [illegible] in the [illegible]. Bark looks like Ladenbergia sp.

Identified by Dr. Little as Sickingia sp.

1858

Kerron No. 44 ✓

Date: Jan. 13, 1944.

Locality: Hacienda Cachiri W of Villa Caro, Sant del Norte.

Altitude: 2400 M.

D.B.H.: 12 inches

Height: 45 ft.

Crown Class: Dominant in open forest, thick underbrush.

Exposure: N slope.

Species: C. pubescens (quina roja)

Bark from trunk

Priority 3

TCA = 1.9

1857

Kerron No. 45 ✓

Date: Jan. 13, 1944.

Locality: Hacienda Cachiri W of Villa Caro, Sant, del Norte.

Altitude: 2,300 M.

D.B.H.: 5 inches

Height: 25 feet

Crown Class: Intermediate in high, dense forest,

Exposure: N slope

Species: C. officinalis (quina fina)

Bark from bole

Priority 2

TCA = 5.6

QS = 4.6

Two seeds, dry, not winged

11

Kernan No. 46.
Date: January 14, 1944.
Locality: Hacienda "El Oso."
Fracion del Ultimo. S E of
Villa Caro, Sant. del Norte.
Altitude: 2080 M.
D.B.H.: 7 inches
Height: 35 feet
Crown class: Dominant
Exposure: Steep N slope near
ridgetop.
Species:
(quina de tierra)
Rondeletia sp. by Dr. Fosberg

13

Kernan No. 47
Date: Jan. 14, 1944,
Locality: Q. Vargas Hacienda
"El Oso." S E of Villa Caro,
Sant. del Norte.
Altitude: 2000 M.
D.B.H.: 8 inches
Height: 45 feet
Crown Class: Co-dominant
Exposure: N W slope.
Species:)
quina masamoro
Unidentified by Dr. Fosberg

✓ 15

Kernan No. $\frac{1804}{48}$
Date: January 14, 1944.
Locality: Quebrada "Las Vargas",
Hacienda El Oro. SE of Villa
Caro, Sant. del Norte.
Altitude: 2,000 M.
D.B.H.: 6 inches
Height: 35 feet
Crown Class: Intermediate
Exposure: Steep W slope
Species: C. officinalis
(quina tuna)
Bark from trunk
Priority 2

TCA = 6.4 Sulphate = 6.1

21

Kernan No. 49.
Date: Jan. 15, 1944.
Locality: El Espartillo. NE of
Villa Caro, Sant. del Norte,
Altitude: 2,200 M.
D.B.H.: 8 inches
Height: 35 ft.
Crown Class: Dominant
Exposure: Dry ridgetop w.
very thick underbrush.
Species: Ladenbergia sp.
(quinon)

TCA=6.5
QS = 7.0

27

1806
Kernan No. 50
Date: January 17, 1944.
Locality: "La Matica". Cordillera
Bucaracica. W of [redacted]
Villa Caro, Sant. del Norte.
Altitude: 2210 M.
D.B.H.: 4 inches
Height: 20 ft.
Exposure: Steep E slope
Crown class: Co-dominant
in thick stand of saplings.
Species: C. officinalis
(quina tuna) cucu
Bark from trunk
Priority 2 guide called "cu-cu"

29

1805
Kernan No. 51
Date: January 17, 1944
Locality: Altura de Bucaracica.
20 yards from Villa Caro –
Ocaña road.
Altitude: 2440 M.
D.B.H.: 16 inches
Height: 45 feet
Crown Class: Dominant
Exposure: Steep N slope
Species: C. pubescens.
(quina roja)
Bark from Trunk
Priority 3

TCA = 3.8

Kernan 52
Date: February 16, 1944.
Locality: Quebrada San Luis (del Paramo). Cumbre del Espartillo. NE of Gramalote, Santander del Norte.
Altitude: Altimeter reads 1400 M, but probably near 2000 M.
D.B.H.: 4 inches
Height: 20 ft.
Exposure: Steep SE slope.
Crown class: Understory of thick, virgin forest, in mancha of quina trees.
Species: C. officinalis
(quina tuna)

Bark from bole

leaves, seeds

Priority 2

Kernan 53
Date: February 16, 1944.
Locality: Santa Maria, Quebrada del Paramo, Camino de Aguas Calientes para Cumbre del Espartillo. NE of Gramalote, Norte de Santander.
Altitude: Altimeter reads 1200 M. but probably near 1800 M
D.B.H.: 6 inches
Height: 35 ft.
Exposure: Steep W slope.
Crown class: Dominant in second-growth forest with thick underbrush.

Species: C. pubescens
(quina roja)

Bark from bole
leaves, incipient flowers

Priority 3

Kernan 54 A-B
Date: Feb. 18, 1944.
Locality: Hacienda El Espejo. Altura del Espejo. Between Q. Esperanza and Q. San Juan Trail from La Victoria to La Union, Santander del Norte.
Altitude: 1600 M.
D.B.H.: 10 inches
Height: 40 ft.
Exposure: Steep NE slope near ridgetop in full sunlight of open pasture.

Species: C. pubescens
(quina roja)

Leaves, stipules, flowers

✓A — Bark from upper bole
B — Re-growth bark from lower bole, TCA = 2.0

Priority 3

Kernan 55
Date: February 19, 1944.
Locality: El Tesoro. Quebrada Trompiales, Headwaters of Q. Cascajales, Cumbre de las Galleritas. Sant. del Norte.
D.B.H.: 5 inches Alt: 1600 M
Height: 30 ft.
Crown class: Intermediate
Exposure: Steep SW slope
Species: Ladenbergia sp. (?
(quina morada)

Stipules, flowers, seeds.

Bark from bole

Priority 3
Testing: [illegible] June 24, 1944.
Ladenbergia [illegible] (?).

Kernan 56
Date: February 19, 1944.
Locality: El Tesoro, Cumbre de las Gallinetas, Santander del Norte.
D.B.H.: 12 inches Alt.: 1650 M
Height: 50 ft.
Exposure: Ridgetop
Crown class: Dominant over thick, scrubby forest.

Species: Ladenbergia sp.
(quinon)

Stipules, seeds

Taxonomy: mem. 3/24/44
Ladenbergia undata

Kernan 57
Date: February 19, 1944.
Locality: Hacienda Balsamina Quebrada, Tornito, Camino de La Victoria Hasta La Union, Santander del Norte,
Altitude: 1400 M
D.B.H.: 18 inches
Height: 60 ft.
Crown class: Dominant
Exposure: SE at bottom of draw.
Species: Guettarda sp.

(quina lancifora)

Stipules, leaves, flowers, fruit.

Taxonomy: mem. 3/24/44
Guettarda discolor

Kernan 58
Date: February 20, 1944.
Locality: Quebrada Uribiribi.
Alto del Venado, Santander
del norte.
Altitude; 1340 M.
D.B.H.: 6 inches
Height: 30 ft.
Crown class: Dominant over
thick underbrush in pasture
Exposure: SW, near bottom
of steep draw.

Species: ~~[illegible] sp. (?)~~
Fosberg: ~~[illegible]~~ 3/24/44.
Cosmibuena grandiflora
Leaves, stipules, flowers,
fruit.

Kernan 59
Date: February 20, 1944.
Locality: Quebrada Uribi-ribi.
Alto del Venado, Santander
del norte.
Altitude; 1340 M.
D.B.H.: 1 inch
Height: 4 ft.

Seedling sprout by trailside
in open pasture.

Species: ~~Ladenbergia sp.~~ (?)
Fosberg: 3/24/44.
Condaminea corymbosa
Leaves, stipules, flowers, fruit.

Kernan 60
Date: February 21, 1944.
Locality: Quebrada de la Cienega. Alto del Venado. Norte,
D.B.H.: 5 inches Altitude: 2300M
Height: 25 ft.
Crown class: Intermediate
Exposure: Steep E slope
Species: C. officinalis
(quina tierra)

Stipules, leaves

Bark from trunk

Priority 2
TCA = 4.6
QS = 3.0

Kernan 61
Date: February 21, 1944
Locality: Quebrada de la Cienega. Alto del Venado, Norte.
Altitude: 2300 M.
D.B.H.: 4 inches
Height: 20 ft.
Crown class: Intermediate
Exposure: E slope
Species: ~~[illegible] (?)~~
[illegible], 3/24/44.
Elaeagia Sp.,
Leaves, Stipules

ark from trunk

Priority 2

62

Kerman 62
Date: February 22, 1944.
Locality: Quebrada Urile-Urile, Alto del Venado,
Santander del Norte.
Altitude: 1540 M.
D.B.H.: 8 inches
Height: 20 ft.
Crown class: Dominant in low, shrubby second growth.
Exposure: Steep N slope.
Species: C. pubescens
(quina roja)

Leaves, stipules, seeds, Incipient flowers.

Bark from trunk

Priority 3
TCA = 1.6

63
A - B

Kerman 63 A - B
Date: February 23, 1944.
Locality: San Aquil, Q. de la Ciénega, Alto del Venado, Santander del Norte,
Altitude: 1950 M.
D.B.H.: 10 inches
Height: 40 ft.
Crown class: Dominant
Exposure: SE slope
Species: C. officinalis
(quina tuna)

Leaves, stipules, seeds

TCA = 5.7 QS = 4.2
A - Bark from trunk

B - Bark from upper side
TCA = 4.5 QS = 3.0
Priority 2

Kernan 64
Date; February 23, 1944.
Locality; San Aguil, Quebrada de la Ciénega. Alto del Venado, Norte de Santander.
Altitude: 1,840 M.
D.B.H.: 12 inches
Height; 50 ft
Crown class; Dominant
Exposure: Steep S E Slope
Species:
(rampachito)

Leaves, stipules, fruit

Fosberg; memo. 3/24/44
Chrysochlamys membranacea
(?)

Kernan 65

Date; February 23, 1944.
Locality: San Aguil, Q. de la Ciénega Alto del Venado, Santander del Norte.
Altitude: 1840 M.
D.B.H.: 4 inches
Height: 20 ft.
Crown class; Intermediate
Exposure; Steep S E Slope
Species:

Leaves, stipules, fruit

Bark from trunk

Priority 3

Kernan 66
Date: February 24, 1944.
Locality: La Rusia, Q. de la Rusia, alto de las Ventanas, Norte de Sant.
Altitude: 2000 M
D.B.H.: 3 inches
Height: 20 ft.
Crown class: Intermediate
Exposure: SE slope
Species: C. officinalis
(quina tuna)
TCA: 4.5 QS = 3.0
[illegible], stipules

Bark from trunk

Priority 2

Kernan 67
Date: February 24, 1944.
Locality: Filo del Venado, Camino de La Arenosa hasta El Cincho, Sant. del Norte.
Altitude: 1060 M. 1560M.
D.B.H.: 10 inches
Height: 40 ft.
Crown class: Co-dominant
Exposure: Steep N slope in high virgin forest.
Species: C. pubescens
(quina roja)

Leaves, stipules, 3 opened flowers.

Bark from trunk

Priority 3

Kernan 68
Date: February 25, 1944.
Locality: Q. del Potrero.
Headwaters of Rio Boma.
Alto de los Pozitos. SW of
La Vega, Sant. del norte.
Altitude: 1400 M.
D.B.H.: 5 inches
Height: 30 ft.
Crown class: Co-dominant
Exposure: Near bottom
of a small draw running
through open pastureland
but, bordered by narrow
strips of scrubby, second-
growth forest.
Species: C. pubescens
(quina roja)
TCA = 1.0
Leaves, stipules, [illegible]
flowers.

Bark from trunk

Priority 3

Kernan 69
Date: February 28, 1944.
Locality: Cuesta de
Monción. Alto del [illegible]
Q. de los [illegible]. NE of
La Vega, Sant. del norte.
Altitude: 1400 M.
D.B.H.: 4 inches
Height: 15 ft.
Crown class: Dominant
Exposure: SW in open
steep pasture.
Species: Ladenbergia sp.
([illegible])

Leaves, stipules, fruit

Kernan 70
Date: February 27, 1944.
Locality: Hacienda Esperanza—ja.
Alto del Gallinazo, N.E. of
La Vega, Sant. del Norte.
Altitude: 1,050 M.
D.B.H.: 1 inch
Height: 15 ft.
Crown class: Suppressed
Exposure: Near bottom of
steep ravine facing SW.
Specimens:

Leaves, stipules, seeds.

Kernan 71
Date: March 1, 1944.
Locality: La Elvira. Alto
del Gallinazo, N.E. of La
Vega, Sant. del Norte.
Altitude: 18.00 M.
D.B.H.: 5 inches
Height: 30 ft.
Exposure: Steep SW slope
Crown class: Dominant
over scrubby second
growth forest.
Specimens:
(Juvenile leaves)

Leaves, stipules, [illegible]
seeds.

Kernan 72
Date: March 1, 1944.
Locality: Q. de Pangil.
El Vagon. NE of La
Vega. Sant. del Norte.
Altitude: 1600 M.
D.B.H.: 6 inches
Height: 25 ft.
Crown class: intermediate
Exposure: N E near
bottom of steep draw.
Species:

Leaves, stipules, flowers

Kernan 73
Date: March 3, 1944.
Locality: Hacienda Santa
Cruz, Q. San Juan NE
of La Vega, Sant. del Norte.
Altitude: 1800 M.
D.B.H.: 6 inches
Height: 30 ft.
Crown class: intermediate
in high, mixed forest.
Exposure: Steep SW Slope.
Species: C. pubescens
(quina roja)
TCA = 1.6.
Leaves, stipules, incipient
flowers.

Bark from trunk

Priority 3

Kernan 74
Date; March 4, 1944,
Locality: Q. Antiguia, Mesa Rica NW of [illegible], Sant. del Norte,
Altitude; 1800 M.
D.B.H.: 7 inches
Height: 45 ft.
Crown class: Co-dominant
Exposure: Steep NE slope in virgin forest.
Species: [Ladenbergia sp.]
(Quinine)
Leaves, stipules

Kernan 75
Date; March 7, 1944,
Locality: NE Slope of Mesa Rica, Sant. del Norte;
Altitude: 1680 M.
D.B.H.: 6 inches
Height: 30 ft.
Crown class: Co-dominant in thick, scrubby forest of predominantly oak-rampacho type
Exposure: NE Slope,
Species: Ladenbergia sp.
(quinine)

Leaves, stipules, seeds

Kernan 76 A - B
Date: March 7, 1944.
Locality: NE side of
Mesa Rica, Between
Rivers Tarra and Borra,
Santander del Norte,
Altitude: 1500 M.
D.B.H.: 8 inches
Height: 40 ft.
Crown class: Co-dominant
Exposure: Steep NE slope
Species: C. pubescens
(quina roja)

Leaves, stipules, flowers
TCA = 2.1
A — Original bark

B — Regrowth bark
TCA = 1.6

Priority 3

Kernan 77
Date: March 11, 1944.
Locality: Altura de San
Pedro. Between Hacarí and
San Calixto, Q. San Pedro.
Santander del Norte.
Altitude: 2100 (approx.)
D.B.H.: 8 inches
Height: 45 ft.
Crown class: Co-dominant
Exposure: SE slope in [illegible],
open forest.
Species: C. officinalis
(quina tuna)
TCA: 4.5 QS = 3.5
Leaves, stipules

Bark from trunk

Priority 3
(Most of the quina in
this locality has al-
ready been harvested).

Kernan 78
Date: March 15, 1944.
Locality: Alto de Santa Cruz. Q. Aguas Blancas. Rio Jama, Sant. del Norte.
Altitude: 1,300 M.
D.B.H.: 5 inches
Height: 30 ft.
Crown class: Intermediate
Exposure: Steep N slope in high, virgin forest.
Species: Ladenbergia
(quina morada)
brookeriana,
Leaves, stipules, flowers.

Bark from branch

Priority 3.

Kernan 79
Date: March 15, 1944.
Locality: Las Cañas, Alto de Las Banderas. Sant. del Norte,
Altitude: 1620 M.
D.B.H.: 12 inches
Height: 60 ft.
Crown class: Co-dominant in high virgin forest.
Exposure: Steep N slope.
Species: Ladenbergia ?
(quinine) undata

Leaves, stipules, fruit, incipient flowers.

Kernan 80
Date: March 15, 1944.
Locality: Q. de Banderas, Alto de las Banderas, Sant. del Norte.
Altitude: 1640 M,
D.B.H.: 18 inches
Height: 70 ft.
Crown class: Dominant
Exposure: SW near bottom of steep draw,
Species: " " (?)
(Guaman)

Leaves, stipules, flowers.

Kernan 81
Date: March 16, 1944.
Locality: Llanonero. Q. del Rio Nuevo. Alto del Panjilla, Sant. del Norte,
Altitude: 1200 M.
D.B.H.: 2 inches
Height: 16 ft.
Crown class: Co-dominant by trailside.
Exposure: Steep ridgetop
Species: Hippotis sp.

Leaves, stipules, flowers

Kernan 82
Date: March 16, 1944.
Locality: Hacienda
"Guiromita", Rio Nuevo,
NW of Las Mercedes.
Sant. del Norte,
Altitude: 1200 M
D.B.H.: 2 inches
Height: 14 ft.
Crown class: Intermediate
Exposure: Steep E Slope,
Species: Picramnia corallo-
(quina tuna) dendron

Leaves, stipules, fruit

Kernan 83
Date: March 17, 1944.
Locality: Q. Parijila. E side of
Alto de las Banderas. Sant-
ander del Norte.
Altitude: 1330 M.
D.B.H.: 16 inches
Height: 80 ft.
Crown class: Co-dominant
Exposure: Steep E slope near
bottom of draw, [illegible]
Species: Ladenbergia $\frac{\top}{N}$,
(quina blanca)

Leaves, stipules, seeds

Kernan 84
Date: March 17, 1944.
Locality: Q. de Panjila. E side of Las Banderas Santander del Norte.
Altitude: 1380 M.
D.B.H.: 1 inch
Height: 15 ft.
Crown class: Suppressed
Exposure: Steep SE slope near bottom of draw.
Species: Hippotis albiflora

Leaves, stipules, flowers

Kernan 85
Date: March 17, 1944.
Locality: Q. Las Banderas. Alto de Las Banderas. Santander del Norte.
Altitude: 1470 M.
D.B.H.: 8 inches
Height: 50 ft.
Crown class: Co-dominant
Exposure: Steep SE slope
Species: Guttiferae (family)(?)

Leaves, stipules

Kernan 86
Date: March 16, 1944.
Locality: Q. de Las Banderas,
Alto de Las Banderas. Sant.
del norte. Altitude: c. 1600 M.
D.B.H.: 6 inches
Height: 33 ft.
Species: Bocconia integrifolia
(poisonous to eat)

Leaves, seeds

Collected and estim-
ated by Leopoldo [illegible]

Kernan 87
Date: March 17, 1944.
Locality: Q. Aguas Blancas,
Alto de Las Banderas, Sant.
del norte.
Altitude: 1180 M.
D.B.H.: 5 inches
Height: 20 ft.
Crown class: Intermediate
Exposure: Steep N.W. side of
[illegible].
Species: Hypzotis sp.
(curious veins || with each vein
between smallest regular veins)
Leaves, stipules, flowers

Kernan 88
Date:, March 18, 1944.
Locality: Q. Aguas Blancas,
Alto de Las Banderas, Sant.
del Norte.
Altitude: 1,060 M.
D.B.H.: 18 inches
Crown class: Dominant
Exposure: Steep W slope,
Species: Kutia alba
(gumón)

Leaves, stipules, flowers

Kernan 89
Date: March 20, 1944.
Locality: Alto de La [illegible],

Border of Rio Tarra. Sant-
ander del Norte.
Altitude: 600 M.
D.B.H.: 2 inches
Height: 15 ft.
Crown class: Suppressed,
shrub in understory.
Species: Condaminea
Corymbosa
(mosocoy.)
Leaves, stipules, flowers

Kernan 90
Date: March 22, 1944.
Locality: La Ronta Alto
de los [illegible]. N of Hacari,
Santander del Norte
Altitude: 900 M.
D.B.H.: 12 inches
Height: 50 ft.
Crown class: Co-dominant
Exposure: SW slope.
Species: Godoya splendida
(Caunillo)

Leaves, stipules, buds,
flowers.

Kernan 91
Date: March 23, 1944.
Locality: Alto de 'Los
Morchos.' N of Hacari,
Santander del Norte,
Altitude: 1100 M.
D.B.H.: 7 inches
Height: 40 ft.
Crown class: Dominant
Exposure: Ridgetop
Species: Ladenbergia sp.
undata

Leaves, stipules, flowers

Kernan 92
Date: March 23, 1944.
Locality: La Punta. Hacienda de Audalecio Lozano Q., Santa Barbara. Alto de Los Morenos. N of Hacarí. Santander del Norte.
Altitude:
D.B.H.: 20 inches
Height: 40 ft.
Species: C. pubescens
(quina roja)

Leaves, stipules, flowers.

Bark from trunk

Priority 2

Collected and estimated by Leopoldo Lerma.

Kernan 93
Date: March 23, 1944.
Locality: La Punta, Alto de Los Morenos N of Hacarí.
Santander del Norte.
Altitude 900 M.
D.B.H. 5 inches
Height 30 ft.
Species: Joosia umbellata
(?)

Leaves, stipules, flowers.

Collected and estimated by Leopoldo Lerma.

Kernan 94
Date: March 25, 1944.
Locality: La Esmeralda. E. La Esmeralda, Vereda La Cordera, Alto de la Mina. Santander del Norte.
Altitude: 1760 M.
D.B.H.: 7 inches
Height: 25 ft.
Crown class: Co-dominant
Exposure: Steep N slope
Species: C. pubescens
(quina roja)

Leaves, stipules, flowers

Bark from trunk and branches

Quantity 3

Kernan 95
Date: March 26, 1944
Locality: Pueblo Nuevo, [illegible] La Pradera R. La Trajunda, W of H[illegible], Alto de la mina, Sant. del Norte
Altitude: 1540 M.
D.B.H.: 5 inches
Height: 28 ft.
Crown class: Dominant in thick secondary, second growth forest. —
Exposure: Steep E slope.
Species: Cinchona [illegible]
(quina [illegible]) flora

Leaves, stipules, seeds.

Kernan 96
Date: March 30, 1944.
Locality: Los Rastrojos. Q. Mesa Llana, Alto de la Mesa. Sant. del Norte.
Altitude: 1920 M.
D.B.H.: 9 inches
Height: 50 ft.
Crown class: Dominant
Exposure: N slope
Species: Billia colombiana

Leaves, stipules, flowers

Kernan 97
Date: March 31, 1944
Locality: Q. del Trabajo, E of San Calixto, Santander del Norte.
Altitude: 1500 M
D.B.H.: 5 inches
Height: 20 ft
Crown class: Co-dominant
Exposure: Steep SW slope near bottom of draw.
Species: C. pubescens
(quina roja)

Leaves, stipules, flowers, seeds

Bark from trunk

Priority 2

Kerman 98
Date: April 1, 1944.
Locality: Hacienda La
Maravilla, R. de [illegible].
San Calixto, Santander
del norte.
Altitude: 2000 M. (approx.)
D.B.H.: 6 inches
Height: 25 ft.
Crown class: Intermediate
Exposure: Steep NE slope
Species: C. officinalis
(quina [illegible])

Leaves, stipules, seeds,
incipient flowers.

Bark from trunk

Priority 2

Kerman 99 A–B
Date: April 8, 1944.
Locality: Hacienda San Luis.
NW ~~NE~~ of Gramalote, Sant. del
Norte.
Altitude: 2030 M.
D.B.H.: 5 inches
Height: 16 ft.
Crown class: Full sunlight
in open pasture.
Exposure: Steep E slope
Species: C. officinalis
(quina tuna)

Leaves, stipules, incipient
flowers, seed-pods
4.2QS 5.2 TCA
A – Bark from lower bole
B – Bark from upper bole
3.9QS 4.8TCA
Priority 2

100

Kernan 100 A-B
Date: April 8, 1944.
Locality: Hacienda San Luis
NW of Guanalate, Sant. del
Martes.
Alt.: 7030M
D.B.H.: 5 inches
Height: 16 ft.
Crown class: full sunlight
in open pasture.
Exposure: Steep E slope
Species: C. officinalis
(quina fina)

Leaves, stipules, incipient
flowers, seed pods

A - Regrowth bark
B - Bark from upper bole
3.2QS 4.4TCA
Priority 2

Tablas de Multiplicar

1 x 1 1	2 x 1 2	3 x 1 3
1 x 2 2	2 x 2 4	3 x 2 6
1 x 3 3	2 x 3 6	3 x 3 9
1 x 4 4	2 x 4 8	3 x 4 12
1 x 5 5	2 x 5 10	3 x 5 15
1 x 6 6	2 x 6 12	3 x 6 18
1 x 7 7	2 x 7 14	3 x 7 21
1 x 8 8	2 x 8 16	3 x 8 24
1 x 9 9	2 x 9 18	3 x 9 27
1 x 10 10	2 x 10 20	3 x 10 30
4 x 1 4	5 x 1 5	6 x 1 6
4 x 2 8	5 x 2 10	6 x 2 12
4 x 3 12	5 x 3 15	6 x 3 18
4 x 4 16	5 x 4 20	6 x 4 24
4 x 5 20	5 x 5 25	6 x 5 30
4 x 6 24	5 x 6 30	6 x 6 36
4 x 7 28	5 x 7 35	6 x 7 42
4 x 8 32	5 x 8 40	6 x 8 48
4 x 9 36	5 x 9 45	6 x 9 54
4 x 10 40	5 x 10 50	6 x 10 60
7 x 1 7	8 x 1 8	9 x 1 9
7 x 2 14	8 x 2 16	9 x 2 18
7 x 3 21	8 x 3 24	9 x 3 27
7 x 4 28	8 x 4 32	9 x 4 36
7 x 5 35	8 x 5 40	9 x 5 45
7 x 6 42	8 x 6 48	9 x 6 54
7 x 7 49	8 x 7 56	9 x 7 63
7 x 8 56	8 x 8 64	9 x 8 72
7 x 9 63	8 x 9 72	9 x 9 81
7 x 10 70	8 x 10 80	9 x 10 90

Kerman Samples 101-200

No. 6 (50 HOJAS)

GOMEZ & PAEZ
IMPRENTA
Y PAPELERIA
BUCARAMANGA

CALLE 35 CARRERA 14
TELEFONO 4-0-5-2

Siempre que Ud. necesite algún artículo de Papelería, o un trabajo de Imprenta y Rayado en condiciones satisfactorias, ocúpenos que lo atenderemos gustosamente.

Calidades, altas; precios, los más bajos.

Kernan no. 101
Date: June 7, 1944,
Locality: Q. Jueve Santo,
Hacienda Cincinnati, Sierra
Nevada de Santa Marta.
D.B.H.: 5 inches
Height: 30 ft.
Crown Class: Suppressed
Exposure: SW slope
Species: Palicourea
angustifolia (?)

leaves, stipules, flowers

Kernan 102
June 8, 1944. Alt.: 1700 M
Locality: Paraiso, Hacienda
Cincinnati. Sierra Nevada
de Santa Marta.
D.B.H.: 1½ inches
Height: 16 ft.
Crown class: Suppressed
Exposure: SW slope
Species:

Leaves, stipules, flowers

Kernan 103
Date: June 4, 1944.
Locality: Paraiso, Hacienda
Cincinnati. Sierra Nevada
de Santa Marta.
Alt.: 1800 M
D.B.H. 2 inches
Height: 12 ft.
Crown class: Suppressed.
Exposure: SW slope
Species: Palicourea
crocea (?)

Leaves, stipules, flowers

Kernan 104
June 8, 1944
Locality: Filvino Ridge,
Hacienda Cincinnati, Sierra
Nevada de Santa Marta.
Alt.: 2040 M.
D.B.H.: ½ inch
Height: 8 ft.
Crown class: Dominant in
full sunlight.
Exposure: Ridgetop.
Species: Weinmannia sp.
(Tolco)

Leaves, stipules, flowers

Kernan 105
Date: June 8, 1944.
Locality: Filvino Ridge, Hacienda
Cincinnati. Sierra Nevada
de Santa Marta.
Alt.: 1900 M.
D.B.H.: 1 inch
Height: 9 ft.
Crown class: Suppressed
Exposure: SW slope
Species: Palicourea sp.
crocea (?)

Leaves, stipules, flowers

Kernan No. 106
Date: Jan. 8, 1944.
Locality: Paraiso, Hacienda
Cincinnati, Sierra Nevada
de Santa Marta.
Alt.: 1620M
D.B.H.: 10 ft. shrub in
undergrowth,
Exposure: SW slope.
Species: [illegible]

Leaves, flowers, fruit,

Kernan 107
Date: Jan. 9, 1944.
Locality: Front of house
at Hacienda Cincinnati,
Sierra Nevada de Santa
Marta.
Alt.: 1480M.
D.B.H.: 4-ft. shrub by
roadside.
Species: Miconia,
aeruginosa

Leaves, stipules, incipient
flowers.

Kernan 108
Date: June 9, 1944.
Locality: Front yard of [illegible] house at Hacienda Cincinnati, Sierra Nevada de Santa Marta.
Alt.: 1480 M.
D.B.H.: 12 inches
Height: 60 ft.
Crown class: Dominant
Exposure: SW
Species: Erythrina edulis

Leaves, stipules, flowers, pods.

Kernan 109
Date: June 11, 1944.
Locality: [illegible] Ridge, San Lorenzo mountains. Hacienda Cincinnati, Sierra Nevada de Santa Marta.
Alt.: 2020 M.
D.B.H. & Height: Woody vine
Exposure: Ridgetop
Species: Hillia parasitica

Leaves, stipules, flowers, seed pod.

Kernan 110
Date: June 11, 1944.
Locality: Cerro [illegible],
Hacienda Cincinnati, Sierra
Nevada de Santa Marta.
Altitude: 2270 ft.
D.B.H.: 9 inches
Height: 40 ft.
Crown class: Intermediate
Exposure: SW slope.
Species:

Leaves, stipules, flowers, buds

Kernan 111
Date: June 11, 1944
Locality: Cerro [illegible]
Hacienda Cincinnati, Sierra
Nevada de Santa Marta.
Alt.: 2370 ft.
D.B.H.: 1½ inches
Height: [illegible] ft.
Crown class: Intermediate
Exposure: SW
Species: Palicourea
amethystina

Leaves, stipules, flowers

Kernan 112
Date: June 11, 1944.
Locality: Cerro Quemado,
Hacienda Cincinnati, Sierra
nevada de Santa Marta.
Alt.: 2260M.
D.B.H.: 7 inches
Height: 32 ft
Crown class: Intermediate
Exposure: S.W.
Species: Randia armata

Leaves, stipules, buds, flowers

Kernan 113
Date: June 13, 1944.
Locality: Cerro Quemado.
Hacienda Cincinnati, San
Lorenzo mountain, Sierra
Nevada de Santa Marta.
Alt.: 1960M.
D.B.H.: 2 inches
Height: 20 ft.
Crown class: Suppressed
Exposure: S.W.
Species: Palicourea
angustifolia
(Aragilla)
Leaves, stipules, flowers

Kernan 114
Date: June 12, 1944.
Locality: Near top of Cerro [illegible], Hacienda Cincinnati, San Lorenzo Mountains. Sierra Nevada de Santa Marta.
Alt.: C. 1500 M.

Specimen of [illegible] shrub collected by M. D. Carriker, Jr.

Species: Befaria phyllyriaefolia
(guinda)

Fruit, flowers

Kernan 115
Date: June 12, 1944.
Locality: Jabali. Hacienda La Victoria. San Lorenzo mountains. Sierra Nevada de Santa Marta.
Alt.: 1580 M.
D. B. H.: 6 inches
Height: 35 ft
Crown class: Co-dominant
Exposure: W slope
Species: Guettarda discolor

Fruits, stipules, buds, flowers.

Kernan 116
Date: June 13, 1944.
Locality: Jaboli. Hacienda
La Victoria, San Lorenzo
Mountains, Sierra Nevada
de Santa Marta.
Alt.: 1690, M.
D.B.H. - 1 inch
Height: 16 ft.
Crown class: Co-dominant
Exposure: SW.
Species:

Fruit, flowers, buds

Kernan 117
Date: June 13, 1944.
Locality: Jaboli. Hacienda
La Victoria. San Lorenzo
Mountains. Sierra
Nevada de Santa Marta.
Alt.: 1740 M,
D.B.H.: 14 inches
Height: 45 ft.
Crown class: Intermediate
Exposure: W slope.
Species: Clusia

(copei)

Fruit, buds, flowers

Kernan 118
Date: June 12, 1944.
Locality: Jalisli. Hacienda
La Victoria. San Lorenzo
mountains. Sierra Nevada
de Santa Marta.
Alt.: 1810 M.
D.B.H.: 2 inches
Height: 16 ft.
Crown class: Suppressed
Exposure: SW slope
Species:

Leaves, stipules, flowers

Kernan 119
Date: June 13, 1944.
Locality: Jalisli. Hacienda
La Victoria. San Lorenzo
mountains, Sierra
Nevada de Santa Marta.
Alt.: 1900 M.
D.B.H.: 4 inches
Height: 20 ft.
Crown class: Intermediate
Exposure: SW slope
Species:
(arenillo)
Leaves, flowers, buds

Kernan 120
Date: June 13, 1944.
Locality: El Campano, Hacienda
Cincinnati. San Lorenzo
Mountains. Sierra Nevada
de Santa Marta.
Alt: 1460 M.
D.B.H.: 2 inches
Ht.: 20 ft.
Crown class: Codominant
Exposure: NE
Species: Holtonia myriantha
([illegible])

Leaves, stipules, fruit, fl

Kernan 121
Date: June 13, 1944.
Locality: El Campano,
Hacienda Cincinnati,
San Lorenzo mountains,
Sierra Nevada de Santa
Marta.
Alt.: 1440 M.
D.B.H.: Low shrub in
understory near bottom
of draw.
Species: Hoffmannia
pauciflora

Leaves, ~~fruit~~, flowers

Kernan 122
Date: June 13, 1944.
Locality: Quebrada de la Arena, Hacienda Cincinnati, San Lorenzo mountains, Sierra Nevada de Santa Marta.
Alt.: 1417 M.
D.B.H.: 18 inches
Height: 30 ft.
Crown class: Dominant
Exposure: SE near bottom of draw.
Species: Vochysia thyrsoidea (campano)(cranon)

Leaves, flowers, fruit.

Kernan 123
Date: June 13, 1944.
Locality: Quebrada Ramona, next to road leading to Hacienda Cincinnati, San Lorenzo mountains, Sierra Nevada de Santa Marta.
Alt.: 1430 M.
D.B.H.: 6 inches
Height: 40 ft.
Crown class: Intermediate
Exposure: SE near bottom of draw.
Species: Bunchosia argentea (Cafe de monte)

Leaves, flowers, fruit

Kernan 124
Date: June 15, 1944.
Locality: Colonia de Luis
Hurtado. NW slope of San
Lorenzo Mountains, Sierra
Nevada de Santa Marta.
Alt.: 2200 M.
D.B.H.: 8 inches
Height: 35 ft.
Crown class: Dominant
Exposure: Steep NW slope
Species: C. pubescens
(quina roja)

Leaves, stipules, incipient
flowers, seed pods.

Bark from trunk

Priority 2

Kernan 125
Date: June 14, 1944.
Locality: Colonia Hurtado,
San Lorenzo mountains
Sierra Nevada de Santa
Marta.
Alt.: 2200 M.
D.B.H.: High shrub in
understory, NW exposure
Species - Saranga

Leaves, flowers, stipules

Kernan 126
Date: June 14, 1944.
Locality: Abandoned clearing on San Lorenzo above Colonia Hurtado. Sierra Nevada de Santa Marta.
Alt.: 2350 M.
D.B.H.: 10 inches
Height: 40 ft.
Crown class: Full sunlight
Exposure: NW
Species: Meriania barbinervis
(flor de mayo)
Leaves, flowers, seed

Kernan 127
Date: June 14, 1944.
Locality: San Lorenzo, Sierra Nevada de Santa Marta.
Alt. 2000 M.
D.B.H.: 2-4 ft. Shrubby tree-like on ridgetops.
Species: Palicourea fastigiata
(ajonjoli)
Leaves, flowers, fruits

Kernan 128
Date: June 14, 1944.
Locality: Jabalí, San
Lorenzo, Sierra Nevada de
Santa Marta.
Alt.: 1800 ft.
D.B.H.: 10 inches
Height: 40 ft.
Crown class; Intermediate,
Exposure: W
Species
(copei)
Leaves, [illegible]
[illegible]

Kernan 129
Date: June 18, 1944,
Locality: Hacienda El Parque
Entre Río Sevilla y Río Frío,
Sierra Nevada de Santa
Marta,
Alt.: 1220 ft.
D.B.H.: 4 inches
Height: 18 ft
Crown class; Intermediate
Exposure, SW
Species: Miconia angustifolia
Canilla de Venado

Leaves, flowers

Kernan 130
Date; June 18, 1944.
Locality; Hacienda El Parque
Entre Río Sevilla y Río Frío.
Sierra Nevada de Santa
Marta.
Alt.: 1220 M.
D.B.H.: 12 inches
Height: 20 ft.
Crown class: Intermediate
Exposure: SW
Species:

Leaves, stipules, buds

Kernan 131
Date: June 18, 1944.
Locality: Hacienda El Parque,
Entre Río Sevilla y Río Frío.
Sierra Nevada de Santa
Marta.
Alt.: 1220 M.
D.B.H.: High shrub by trail-
side.
Exposure: SW
Species: Palicourea

Leaves, stipules, flowers

Kernan 132
Date; June 19, 1944.
Locality: Trailside near
San Andrés. Sierra Nevada
de Santa Marta.
Alt.: 1400M.
D.B.H.: 16 inches
Height: 60 ft.
Crown class: Co-dominant
Exposure: NW slope
Species:
(naranjillo)
([illegible])
Leaves, flowers

Kernan 133
Date; June 20, 1944.
Locality: Camino San Andrés –
Palmichal. Entre Río Sevilla y
Río Frío. Sierra Nevada de Santa
Marta.
Alt.: 1800M.
D.B.H.: 8 inches
Height: 50 ft.
Crown class: Dominant
Exposure: Ridgetop
Species:
(quina amarilla o blanca)
(Calisaya)
Leaves, stipules, bark, seeds,
capsules

Bark from trunk

Priority 2

wait quina memo of July 24
from Dr. Bibbi

Kerman 134
Date: June 20, 1944.
Locality: Camino San Andrés – Palmichal, Entre Rio Sevilla
y Rio Frio. Sierra Nevada de
Santa Marta
Alt.: 1800 m.
D.B.H.: 7 inches
Height: 35 ft.
Crown [illegible] Co-dominant
Exposure: SW
[illegible]

Trees, [illegible], [illegible], [illegible]

Kerman 135
Date: June 21, 1944.
Locality: Hacienda San José
R. San José, Rio Frio.
Sierra Nevada de Santa
Marta.
Alt.: 1250

7' plant in thick forest
by trailside.
Species:
(Costus sp.)
Used as a [illegible] in the
mountains.

Kernan 136
Date: June 21, 1944.
Locality: Quebrada San José. Hacienda 'Sanjosé'.
Headwaters of Rio Frio.
Sierra Nevada de Santa Marta.
Alt.: 1110 M.
Hab.: 10 foot shrub in understory.
Exposure: SE
Species
([illegible])

Leaves, stipules, flowers

Kernan 137
Date: June 23, 1944.
Locality: near 'Cansamana'
at head of Rio Sevilla.
W side of Sierra Nevada de
Santa Marta.
Alt.: 2500 M.
Tall shrub in full sun-
light, by trailside.
Species:

Leaves, stipules, buds, flowers

Kernan 138
Date: June 24, 1944.
Locality: On trail a little above Palmichal, on ridge between drainage of Rio Sevilla and Rio Frio W side of Sierra Nevada de Santa Marta.
Alt.: 2240 M.
D.B.H.: 12 inches
Height: 40 ft.
Crown class: Dominant
Exposure: W
Species:
(genus)

Leaves, stipules, seeds

Bark from trunk

Priority 2

Memo. of July 13 from Dr. [illegible] says it is not cinchona and will not [illegible].

Kernan 139
Date: June 24, 1944.
Locality: Near trail a little above Palmichal on ridge dividing Rio Sevilla and Rio Frio, W side of Sierra Nevada de Santa Marta.
Alt.: 2200 M.
D.B.H.: 14 inches
Height: 30 ft.
Crown class: Dominant
Exposure: SW
Species:
(genus)

Leaves, stipules, seeds

Kernan 140
Date: June 25, 1944.
Locality: Trail above [illegible] to [illegible]. Between drainage of Rio Grande and Rio [illegible]. W side of Sierra Nevada de Santa Marta
Alt.: 2740 M.
D.B.H.: 2½ inches
Height: 16 ft.
Crown class: Full sunlight of [illegible], [illegible].
Exposure: W
Species: Vallea
([illegible])

Leaves, stipules, seedy flowers.

Kernan 141
Date: June 25, 1944.
Locality: San Lorenzo N 24 W [illegible] N 7 W. Between Rio Grande and Rio [illegible]. W drainage of Sierra Nevada de Santa Marta.
Alt.: 3400 M.
Species: Foeniculum vulgare

½ plant growing in rocks on ridge top.

Herman 142
Date June 23, 1944.
Locality: Trail San Lorenzo –
Palomino W. side of Sierra
Nevada de Santa Marta.
Alt.: 3380 M.

Plant 4' high in open paramo.
Species: Ranunculus

Herman 143
Date: June 27, 1944.
Locality: Filo de Palomino,
headwaters of Rio Frio. W.
drainage of Sierra Nevada
de Santa Marta.
Alt.: 2080 M.
D.B.H.: 6 in.
Height: 25 ft.
Exposure: NE
Crown class: Intermediate
Species: Conomorpha
peruviana

Flowers, sepals, seeds

Kernan 144
June 27, 1944.
Locality: Filo de Palmichal,
Headwaters of Rio Frio W
drainage of Sierra Nevada
de Santa Marta.
Alt.: 2060 M.
D.B.H.: 6 inches
Height: 40 ft.
Crown class: Co-dominant
Exposure: Ridgetop N
Species: Ladenbergia
(Quina blanca, Cascarilla
amarga)

Leaves, stipules, seed pods.

Bark from trunk

Priority 3

memo. of July 13 from Dr.
Billie says this is not cin-
chona bark and does not
plan to extract it.

Kernan 145
Date: June 27, 1944.
Locality: F.B. below Palmichal
Ridge between Rio [illegible] +
Rio Frio, W drainage of Sierra
Nevada de Santa Marta,
Alt.: 1960 M.
D.B.H.: 8 inches
Height: 40 ft.
Exposure: W
Crown class: Co-dominant
Species: Topobea (?)

Leaves, buds, flowers

Kernan 146
Date: June 28, 1944.
Locality: Roza de Benito
Jorge. Drainage of Rio
Sevilla. W of Sierra Nevada
de Santa Marta.
Alt.: 1780
D.B.H.: 6 inches
Height: 30 ft.
Crown class: Co-dominant
on edge of clearing
Exposure: Steep S. slope
Species:
([illegible])

Leaves, flowers

Kernan 147
Date: June 28, 1944.
Locality: Pie del Palmichal.
Divide between Rio Sevilla
and Rio Frio. West side of
Sierra Nevada de Santa
Marta.
Alt.: 1820 ft.
D.B.H.: 3 inches
Height: 20 ft.
Crown class: Intermediate
Exposure: Ridge top W
Species: Weigeltia
([illegible])

Leaves, stipules, flowers

Kernan ~~[illegible]~~ 148
Date: June 23, 1944.
Locality: Alto de Cebolletal
Camino [illegible]
W side of Sierra Nevada de
Santa Marta.
Alt.: 2282 M.
D.B.H.: 5 inches
Height: [illegible] ft.
Crown class: Dominant
Exposure: Ridge top
Species:

leaves, stipules, fruit

Kernan 149
Date: June 30, 1944.
Locality: Bella Vista Trail
Quibumaca - San Andres. W
drainage of Sierra Nevada
de Santa Marta
Alt.: 900 M.
D.B.H.: 24 inches
Height: 40 ft.
Crown class: Dominant
Exposure: SW
Species:
(Carretillo amarillo)

leaves, stipules, flowers

Kerman 150
Date: June 30, 1944.
Locality: El Porvenir, Old trail from Aracataca to San Andres. W drainage of Sierra Nevada de Santa Marta.
Alt.: 540M.

Low shrub by trailside in full sunlight of cut-over brush-land.
Species: Rondeletia

Leaves, stipules, flowers, seeds

Kerman 151
Date: July 17, 1944.
Locality: Headwaters of the Tucurinca on trail to para-mo. W drainage of Sierra Nevada de Santa Marta.
Alt.: 1790M.
Exposure: SW
Low, trailing Liliaceous vine in open, burned mountain-side, with fern as dominant plant. Used as medicine for children by Indians and called "Zgee" by them.

~~Bo~~ Bomarea

Kernan 152
Date: July 17, 1944.
Locality: Headwaters of Rio Tucurinca. Above Mamarongo
W drainage of Sierra Nevada de Santa Marta.
Alt.: 1630,
D.B.H.: 8 inches
Height: 25 ft.
Crown class: Intermediate
Exposure: SW
Species:

Leaves, stipules, buds, flowers,

Kernan 153
Date: July 19, 1944.
Locality: On trail Mamarongo - Cirandera. Upper drainage of Rio Tucurinca. Sierra Nevada de Santa Marta.
Alt.: 1700 M.,
D.B.H.: 12 inches
Height: 30 ft.
Crown class: Co-dominant
Exposure: Steep NW slope
Species:

Leaves, stipules, flowers

154 - 155 - 156

Kernan 154.
July 23, 1944 Alt.: 3120
Andrídua, Headwaters of
Río Aracataca.
Species: Hypericum (?)

Kernan 155
July 23, 1944. Alt.: 3040
Andrídua, Headwaters of
Río Aracataca.
Species: Vallea stipularis

Kernan 156
July 23, 1944. Alt.: 3000 M.
Andrídua. Headwaters of
Río Aracataca.
Species: Sisyrinchium

157 - 158 - 159

Kernan 157
July 23, 1944. Alt.: 2880 M
Río Garalion. Headwaters
of Río Aracataca.
Species: "Loranthus

Kernan 158
July 23, 1944. Alt.: 2880 M.
Río Garalion, Headwaters
of Río Aracataca.
Species: Lupinus

Kernan 159
July 23, 1944. Alt.: 2860 M.
Río Garalion. Headwaters
of Río Aracataca.
Species: Solanum (potato)

160 – 161

Kerman 160
July 23, 1944. Alt.: 2860M.
Río Garalon. Headwaters
of Río Aracataca.
Species: Pasaflora

Kerman 161
July 25, 1944. Alt.: 2680M,
Río Maránchugua. Headwaters
of Río Aracataca
Species: Berberis
"Chouná" Roots used by Arhuacos
for dyeing.

162

Kerman 162
Date: July 27, 1944.
Locality: Bouncuai. Río
Aracataca. W drainage of
Sierra Nevada de Santa Marta,
Alt.: 1890M.
D.B.H.: 6 inches
Height: 80 ft.
Crown class: Intermediate
Exposure: SW near bottom of
steep draw.
Species: Rondeletia

leaves, stipules, pods, flowers

Kernan 163
Date: July 27, 1944.
Locality: Bavincuai. Río Aracataca. W drainage of Sierra Nevada de Santa Marta.
Alt.: 1920 M.
D.B.H.: 10 inches
Height: 60 ft.
Crown class: Dominant
Exposure: Southwest
Species:

Leaves, stipules, flowers

Kernan 164
Date: July 28, 1944.
Locality: Trail Serancua – Nitabué. Río Aracataca. W drainage of Sierra Nevada de Santa Marta.
Alt.: 1360 M.
D.B.H.: 36 inches
Height: 90 ft.
Crown class: Dominant
Exposure: NW
Species:
(guama roja)

Leaves, stipules, seeds

Kernan 165
Date: July 30, 1944.
Locality: Trail Yuracal–Chinchorro. (Serancua–Guamachico). Drainage of Río Aracataca. W side of Sierra Nevada de Santa Marta.
Alt.: 1180 M.
D.B.H.: 6 inches
Height: 40 ft.
Crown class: Co-dominant
Exposure: SW
Species:

Leaves, stipules, fruit

Kernan 166
Date: July 31, 1944.
Locality: Cerrijo, Río ~~[illegible]~~ Tucurinca. Trail Serancua–Guamachico. W drainage of Sierra Nevada de Santa Marta.
Alt.: 350 M.
D.B.H.: Stump sprout 3"
Height: 5 ft.
Crown class: [illegible]
Exposure: SW
Species:
("guamo cabuyo")

Leaves, stipules, seeds

Kerman 167
Date: July 31, 1944.
Locality: Trail Cangó - Santa Rosa (Seremuna - Guamachito). Río Tucurinca, W. drainage of Sierra Nevada de Santa Marta.
Alt.: 300 M.
D.B.H.: 8 inches
Height: 30 ft.
Crown class: Co-dominant
Exposure: SW
Species: Mussaenda sp.
(quina)

Leaves, stipules, flowers

Kerman 168
August 19, 1944.
½ mi. below Pueblo Bello to E. Río Ariguaní. Sierra Nevada de Santa Marta. Alt.: 880 M.
Species:
(Vicho)

Kerman 169
August 19, 1944. Alt.: 880 M.
Río Nacucuchunguaca, 2 mi. E of Pueblo Bello, Sierra Nevada de Santa Marta.
Species: Randia
(espinito)

Kerman 170
August 19, 1944, Alt.: 980 M
Cerro del Castillo. 2½ mi S of Pueblo Bello, Sierra Nevada de Santa Marta.
Species:
Yerba mora

168 - 170

These no. do not apply to spec.

Kerman 168
Date: August 19, 1944.
Locality: Valley of Rio
Ariguaní, S of Pueblo
Bello, Sierra Nevada S. Ma.
Alt.: 1000 M.
Species:

Kerman 169
Date: August 19, 1944
Locality: Valley of Rio
Ariguaní, S. of Pueblo
Bello. Sierra Nevada de
Santa Marta.
Alt.: 1200 M.

Kerman 170
Date: August 19, 1944.
Locality: Cerro Castillo
S of Pueblo Bello. Rio
Ariguaní, Sierra Nevada
de Santa Marta, Alt.: 1600 M.
Species:

Tablas de Multiplicar

1 x 1	1	2 x 1	2	3 x 1	3
1 x 2	2	2 x 2	4	3 x 2	6
1 x 3	3	2 x 3	6	3 x 3	9
1 x 4	4	2 x 4	8	3 x 4	12
1 x 5	5	2 x 5	10	3 x 5	15
1 x 6	6	2 x 6	12	3 x 6	18
1 x 7	7	2 x 7	14	3 x 7	21
1 x 8	8	2 x 8	16	3 x 8	24
1 x 9	9	2 x 9	18	3 x 9	27
1 x 10	10	2 x 10	20	3 x 10	30
4 x 1	4	5 x 1	5	6 x 1	6
4 x 2	8	5 x 2	10	6 x 2	12
4 x 3	12	5 x 3	15	6 x 3	18
4 x 4	16	5 x 4	20	6 x 4	24
4 x 5	20	5 x 5	25	6 x 5	30
4 x 6	24	5 x 6	30	6 x 6	36
4 x 7	28	5 x 7	35	6 x 7	42
4 x 8	32	5 x 8	40	6 x 8	48
4 x 9	36	5 x 9	45	6 x 9	54
4 x 10	40	5 x 10	50	6 x 10	60
7 x 1	7	8 x 1	8	9 x 1	9
7 x 2	14	8 x 2	16	9 x 2	18
7 x 3	21	8 x 3	24	9 x 3	27
7 x 4	28	8 x 4	32	9 x 4	36
7 x 5	35	8 x 5	40	9 x 5	45
7 x 6	42	8 x 6	48	9 x 6	54
7 x 7	49	8 x 7	56	9 x 7	63
7 x 8	56	8 x 8	64	9 x 8	72
7 x 9	63	8 x 9	72	9 x 9	81
7 x 10	70	8 x 10	80	9 x 10	90